cabin mate

Installation, Operation and Maintenance

MARINE AIR SYSTEMS®

Revised: 20140328
L-2271

CE

PREFACE

Congratulations on the purchase of your Marine Air Systems' CABIN MATE air conditioner. No matter which of the following features was the reason for your purchase of this air conditioner, we are sure it will meet your needs and will give you many years of efficient and trouble free use. The CABIN MATE units are self-contained direct expansion air conditioners designed for marine applications incorporating the following features:

- High efficiency rotary compressors
- Cupronickel condenser coil
- Raised lance fin designed evaporator coil
- Insulated anti-vibration base pan
- Pre-charged and pre-wired systems for easy connections
- Electrical box with fire retardant cover mounted on unit for access and service
- Blower can be repositioned for either vertical or horizontal (standard) discharge
- Charge Guard® ensured environmental protection and system integrity

This manual is intended to provide the information necessary to ensure proper installation, operation, and maintenance of the unit. Improper installation or misunderstood operating procedures can result in unsatisfactory performance and/or premature failure of these units, so before proceeding ***please read this manual completely.***

The CABIN MATE a/c units are covered under the existing Marine Air Systems' warranty policy contained in this manual. In the interest of product improvement, Marine Air Systems' specifications and design are subject to change without prior notice.

IF YOU HAVE A DIGITAL CONTROL

Please refer to either the Elite Control manual or the Passport I/O Control manual for installation and operation of those digital control panels. Mechanical control information and wiring diagrams for both types of controls are in this manual.

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MARINE AIR SYSTEMS

Marine Air Systems (MAS) is a product of Dometic Environmental Corporation. Dometic is a recognized leader in the design and manufacture of high-performance comfort control systems, refrigeration products and battery charging products for demanding environments, including commercial and recreational marine craft, vehicles and other applications. We offer an unparalleled scope of products, dealer networks, applications support, engineering resources and production capabilities throughout the world. Our team has many years of experience in the design, manufacture, application and support of our products. Our practical experience and design capability allows our application engineers and sales representatives to offer optimum solutions for your environmental control requirements. Product lines also include well known Cruisair, Grunert, and Sentry.

CLEAN AIR ACT AMENDMENTS OF 1990 [TITLE VI - SECTION 608(C-1)]

"Effective July 1, 1992, it shall be unlawful for any person, in the course of maintaining, servicing, repairing, or disposing of an appliance or industrial process refrigeration, to knowingly vent or otherwise knowingly release or dispose of any Class 1* or Class II** substance used as a refrigerant in such appliance (or industrial process refrigeration) in a manner which permits such substance to enter the environment. De minimis releases associated with good faith attempts to recapture and recycle or safely dispose of any such substances shall not be subject to the prohibition set forth in the proceeding sentence."

* Class I substances include CFC-12

** Class II substances include HCFC-22

INSTALLATION

SAFETY CONSIDERATIONS

VERY IMPORTANT: Never install your air conditioner In the bilge or engine room areas. Insure that the selected location is sealed from direct access to bilge and/or engine room vapors. Do not terminate condensate drain line within three (3) feet of any outlet of engine or generator exhaust systems, nor in a compartment housing an engine or generator, nor in a bilge, unless the drain is connected properly to a sealed condensate or shower sump pump.

Installation and servicing of this system can be hazardous due to system pressure and electrical components. When working on this equipment, always observe precautions described in the literature, tags and labels attached to the unit. Follow all safety codes. Wear safety glasses and work gloves and place a fire extinguisher close to the work area. The following is a summary of the labels on the unit:

! DANGER ELECTRICAL SHOCK HAZARD. DISCONNECT VOLTAGE AT MAIN PANEL OR POWER SOURCE BEFORE OPENING ANY COVER. FAILURE TO COMPLY MAY RESULT IN INJURY OR DEATH.

! WARNING THIS COMPONENT DOES NOT MEET FEDERAL REQUIREMENTS FOR IGNITION PROTECTION. DO NOT INSTALL IN SPACES CONTAINING GASOLINE ENGINES, TANKS, LPG/CPG CYLINDERS, REGULATORS, VALVES OR FUEL LINE FITTINGS. FAILURE TO COMPLY MAY RESULT IN INJURY OR DEATH.

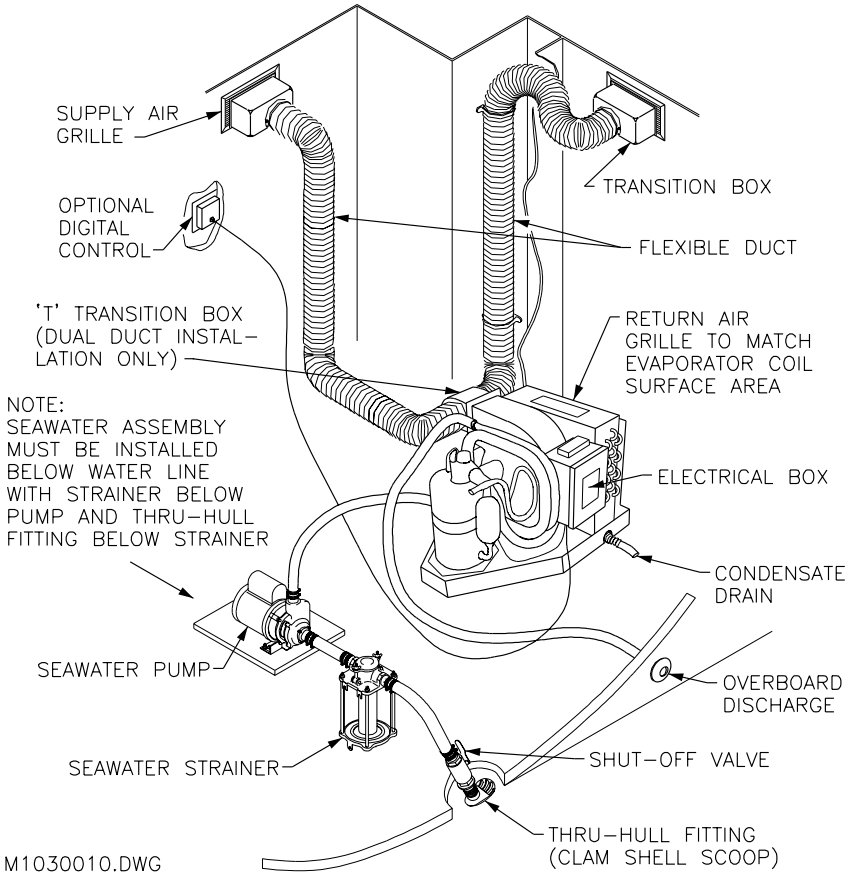
NOTICE THIS COMPONENT IS CHARGED WITH HYDROCHLOROFLUOROCARBON (HCFC) REFRIGERANT R22. EFFECTIVE JULY 1,1992 IT SHALL BE UNLAWFUL FOR ANY PERSON TO KNOWINGLY VENT OR OTHERWISE KNOWINGLY RELEASE ANY CLASS 1 (CFC) OR CLASS 2 (HCFC) SUBSTANCE AS A REFRIGERANT IN A MANNER WHICH PERMITS SUCH SUBSTANCE TO ENTER THE ATMOSPHERE PER THE CLEAN AIR ACT OF 1990. PUBLIC LAW 101-549 TITLE IV SECTION 608-C. FAILURE TO COMPLY MAY RESULT IN SEVERE PENALTIES, INCLUDING FINES AND IMPRISONMENT.

! WARNING TO MINIMIZE THE HAZARD OF ELECTRICAL SHOCK AND PERSONAL INJURY, THIS COMPONENT MUST BE EFFECTIVELY GROUNDED. REFER TO THE INSTALLATION GUIDELINES FOR FURTHER INFORMATION.

CAUTION! HIGH COMPRESSOR TEMPERATURE IS NORMAL**. DO NOT TOUCH!**

PLACEMENT OF SYSTEM

Selecting a good location for your air conditioner is the most important part of your preparations. Be sure to consider the size of the area you are cooling, the air distribution needs, and the size of the unit you have chosen. Keeping in mind that cool air has a tendency to fall, it is highly recommended that you locate the supply air grille as high as possible in the cabin. See diagram below.


SUPPLY AIR GRILLE
TRANSITION BOX
OPTIONAL DIGITAL CONTROL
FLEXIBLE DUCT
'T' TRANSITION BOX (DUAL DUCT INSTAL-LATION ONLY)
RETURN AIR GRILLE TO MATCH EVAPORATOR COIL SURFACE AREA
NOTE: SEAWATER ASSEMBLY MUST BE INSTALLED BELOW WATER LINE WITH STRAINER BELOW PUMP AND THRU-HULL FITTING BELOW STRAINER
ELECTRICAL BOX
CONDENSATE DRAIN
SEAWATER PUMP
OVERBOARD DISCHARGE
SEAWATER STRAINER
SHUT-OFF VALVE
THRU-HULL FITTING (CLAM SHELL SCOOP)
M1030010.DWG

Tools required

- Screwdrivers
- Pliers
- Pipe wrench
- Wire cutters/crimpers
- Drill & 7/8" bit
- Jig saw
- Duct tape
- Electrical tape
- Threaded-seal tape
- Beding compound to seal thru-hull fittings
- Hardware to secure unit, pump, strainer, grilles & control panel

The CABIN MATE® unit should be installed as low as possible, **BUT NEVER IN THE BILGE OR ENGINE ROOM AREAS. INSURE THAT THE SELECTED LOCATION IS SEALED FROM DIRECT ACCESS TO BILGE AND/OR ENGINE ROOM VAPORS.** Installing the unit as low as possible (such as under a V-berth, dinette seat or bottom of a locker) and ducting the supply air as high as possible, creates an ideal air flow condition. This type of installation will prevent short or premature cycling.

The unit should be positioned on a firm, level, horizontal surface and the condensate drain line should run downward and aft from the unit to a suitable drain location sealed away from any exhaust or bilge vapors. Plan all connections which must be made prior to starting installation, including ducting, condensate drain, cooling water in and out, electrical power connections, location of control panel, and seawater pump placement and plumbing, to assure easy access for installation and servicing.

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REV	DATE	REVISION DESCRIPTION	DWG	APR
A	2/16/00	ADDED DOWNPIPE TO COND. COIL DCR#CAD070-00	MJS	R P
B	7/3/01	REVISE PROJECTIONS, ADD VIEW CALLOUTS, CAD622-01	DRR	DKM
C	2/9/04	REVISED DIMENSIONS, ADD 5K, ADD DUCT SIZE, CAD083-04	DKM	R P

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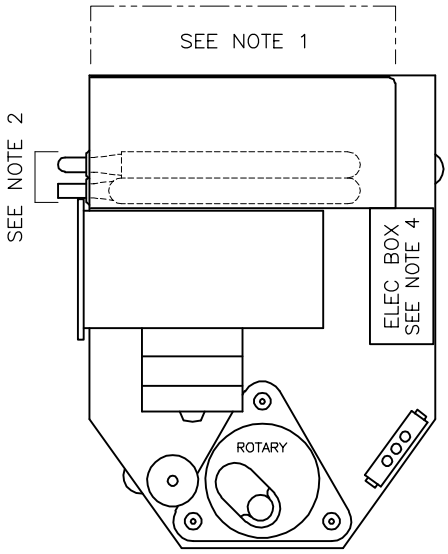
17 Oct 01 – 03:18 pm

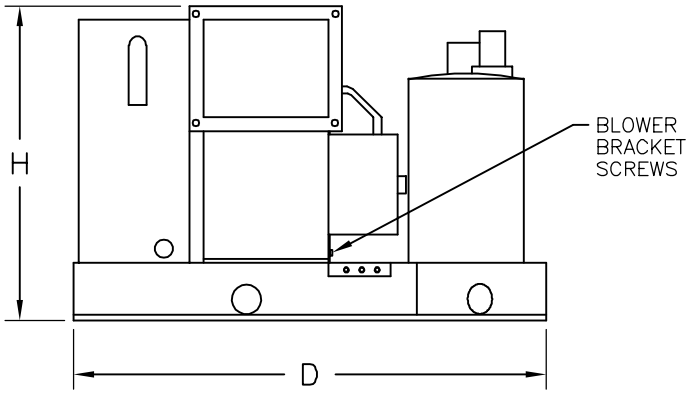
SPACE ALLOWANCES TO CONSIDER WHEN DESIGNING AREA FOR A/C UNITS

1) Allow a minimum 3.00" [7.62cm] of air space in front of evaporator for return air intake if it is adjacent to a bulkhead.
2) A minimum of 4.00" [10.16cm] is required for clamping seawater connections.
3) For flexible ducting connection:
   A) If mount ring is used, allow 2.00" [5.08cm] for the ring, 1.00" [2.54cm] for duct bend radius and add the diameter of the ducting to get total distance as measured from blower outlet.
   B) When using a transition box consider that each box is unique to it's application. A general rule is to add 1.00" [2.54cm] to the largest ring diameter used to get size of box (5" min.). Add mount ring and ducting as figured above to get approximate space needed to install transition box. Also note that the universal T–box is 8.00" [20.32cm] tall measured from blower outlet.
4) Allow enough room for removal of electric box cover for servicing.
5) Blower may be positioned either horizontal or vertical by removing blower bracket screws, sliding blower with plate up and out of track, then slide into desired position and replace screws.

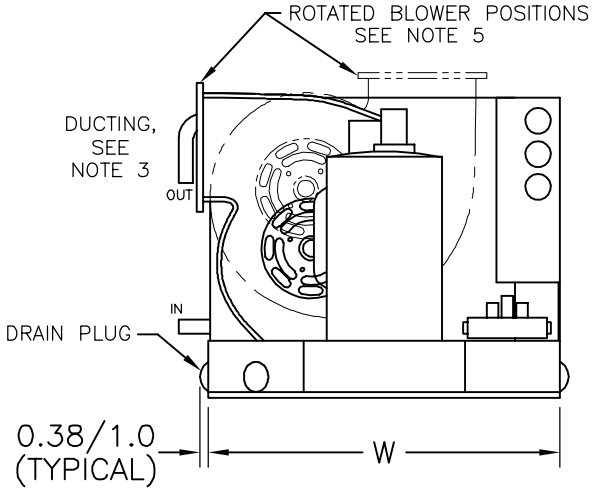
NOTE: The above dimensions are minimums. Enough space should be allocated for installation and serviceability.



TOP VIEW



SIDE VIEW



REAR VIEW

MODEL NUMBER	DIMENSIONS (inches/milimeters) H	W	D	DUCT SIZE	WEIGHT (lbs/kg)
CMCP/M5K	11.50/292	13.25/337	17.75/451	5/127	45.5/20.6
CMCP/M7K	12.25/311	13.25/337	17.75/451	5/127	50.5/22.9
CMCP/M10K	13.00/330	14.25/362	18.25/464	6/152	58.1/26.4
CMCP/M12K	14.25/362	14.25/362	18.25/464	6/152	58.6/26.6
CMCP/M16K	14.25/362	14.25/362	19.88/505	7/178	65.0/29.5

ALL DIMENSIONS ARE NOMINAL - VERIFY ALL CRITICAL DIMENSIONS WITH MAS ENGINEERING.

Dometic Corporation	Marine Air Systems

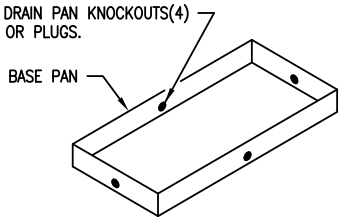
CMCP/M5-16K CABIN MATE
SPACING ALLOWANCES AND DIMENSIONS

DATE: 01/26/00	DWG BY: RMW	PART NUMBER: N/A	DWG M1020043	REV C
SCALE: 1/8	APR BY: R P			

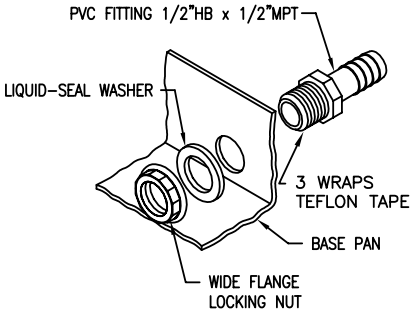
HOW IT WORKS

Your self-contained air conditioner consists of four main components and a refrigerant gas circulating through the system. The BLOWER draws warm cabin air across the fins on the EVAPORATOR where the heat from the air is transferred to the refrigerant in the evaporator coil. As the refrigerant evaporates from a liquid into a gas it absorbs the heat from the cabin air. The COMPRESSOR then compresses the refrigerant gas and pumps it through the outer tube in the CONDENSER COIL. The seawater pump circulates cool seawater through the inner tube in the condenser coil; this cools the refrigerant and condenses it into a liquid. The heat from the refrigerant is exchanged to the seawater and discharged overboard. The liquid refrigerant is then passed through the EVAPORATOR COIL and the cycle repeats. Removing heat from the cabin air lowers its temperature. The cooled air is blown through the ducting and out the supply air grille(s). For reverse cycle heating, the refrigerant flows in the opposite direction through the reversing valve. Heat is transferred from the seawater in the condenser coil to the refrigerant and then to the air blowing through the evaporator into the cabin.

CONDENSATE DRAINS



The Cabin Mates condensate drain pan is 2" high with three drain locations. During conditions of high humidity, condensate may be produced at a rate of approximately 2 gallons per hour. With this in mind, it is important to route condensate drains downward to a sump pump. It is not recommended to route condensate drains to the bilge. After the condensate drain installation is complete, test the installation by pouring a quart of water into the pan and checking for good flow.

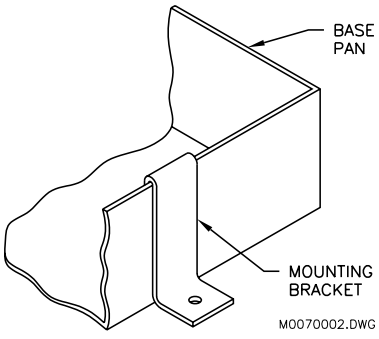


For installation of the condensate drain:

1. Remove the aft facing watertight plug from the base pan of the Cabin Mate® unit.
2. Slip the solid washer and the liquid-seal washer onto the PVC fitting in that order.
3. Connect the fitting through the exposed hole in the base pan with the locking nut.
4. Securely tighten with two (2) wrenches to provide a proper seal.
5. Attach a 5/8" I.D. reinforced hose to the hose barb and secure with stainless steel hose clamps.
6. Install the condensate drain hose downhill from the unit and aft to a sump.
7. Two drain fittings may be used and the hoses teed together provided there is a minimum 2" drop from the bottom of the base pan to the tee connection.

NOTE: DO NOT TERMINATE CONDENSATE DRAIN LINE WITHIN THREE (3) FEET OF ANY OUTLET OF ENGINE OR GENERATOR EXHAUST SYSTEMS, NOR IN A COMPARTMENT HOUSING AN ENGINE OR GENERATOR, NOR IN A BILGE, UNLESS THE DRAIN IS CONNECTED PROPERLY TO A SEALED CONDENSATE OR SHOWER SUMP PUMP.

MOUNTING BRACKETS



The a/c unit is supplied with a base pan that also serves as a condensate pan. Mounting clip brackets and screws (4) are provided to secure the base pan onto a flat, horizontal surface.

BLOWER ROTATION

The Cabin Mate® blower assembly is capable of either horizontal (as shipped from the factory) or vertical discharge. If vertical discharge is required, then follow these instructions: Disconnect main power supply. Remove self-tapping screws from blower bracket, shown in drawing M1020043 in this manual. Slide blower assembly straight up and out of the slotted mounting brackets on the coil shroud. Rotate blower assembly 90 degrees to desired position. Slide blower assembly back into the mounting slots on both sides of the shroud. Replace the self-tapping screws through the blower bracket into the blower housing. Important: do not use screws longer than those provided.

SUPPLY & RETURN AIR GRILLES AND TRANSITION BOXES

Install the supply air grille as high as possible in a location that will provide uniform air distribution throughout the cabin, grille louvers should be directed upward. The return air grille should be installed as low and close to the a/c unit as possible to insure direct uninterrupted airflow to the evaporator. The return air grille should have a minimum four inches (4") of clearance in front of it, free from any furniture or other obstructions. The supply air grille should be installed to blow freely into the cabin. It should not be installed behind a door or in a close proximity to an adjacent bulkhead, as this will cause the system to short cycle. In no instance should a supply air discharge be directed towards a return air grille, as this will also cause the system to short cycle. Allow for adequate clearance behind the supply air grille(s) for the transition box and ducting connection. The following table shows minimum grille sizes. See the MAINTENANCE section of this manual for return air filter cleaning instructions.

DUCTING

Good airflow is critical for the performance of the entire system. It is highly dependent on the quality of the ducting Installation. The ducting should be run as straight, smooth and taut as possible minimizing the number of 90 degree bends (two tight 90 degree bends can reduce airflow by 25%). The following table shows minimum duct diameters and their corresponding supply and return air grille minimum areas in square inches. If a transition box is used, the total area of supply air ducts going out of the box should equal the area of the supply duct feeding the box. To calculate the square inch area of a round duct, multiply the radius by itself (r^2) and multiply that number by 3.1416(π).

MODEL	7K	10K	12K	16K
DUCT DIA	5" dia	6" dia	6" dia	7" dia
DUCT AREA	19.6 sq in	28.3 sq in	28.3 sq in	38.5 sq in
R/A GRILLE	88 sq in	98 sq in	140 sq in	168 sq in
S/A GRILLE	40 sq in	50 sq in	70 sq in	84 sq in

The following is a summary of proper ducting connections:

1. Pull back the fiberglass insulation exposing the inner mylar duct hose.
2. Slide the mylar duct hose around the mount ring until it bottoms out.
3. Screw 3 or 4 stainless steel sheet metal screws through the duct hose into the transition ring. Make sure to catch the wire in the duct hose with the heads of the screws. Do not use band clamps, as the hose will slide off.
4. Wrap duct tape around the ducting and ring joint to prevent any air leaks.
5. Pull the insulation back up over the mylar to the ring and tape this joint.
6. Remove excess ducting and use the same connection method at the supply air grille

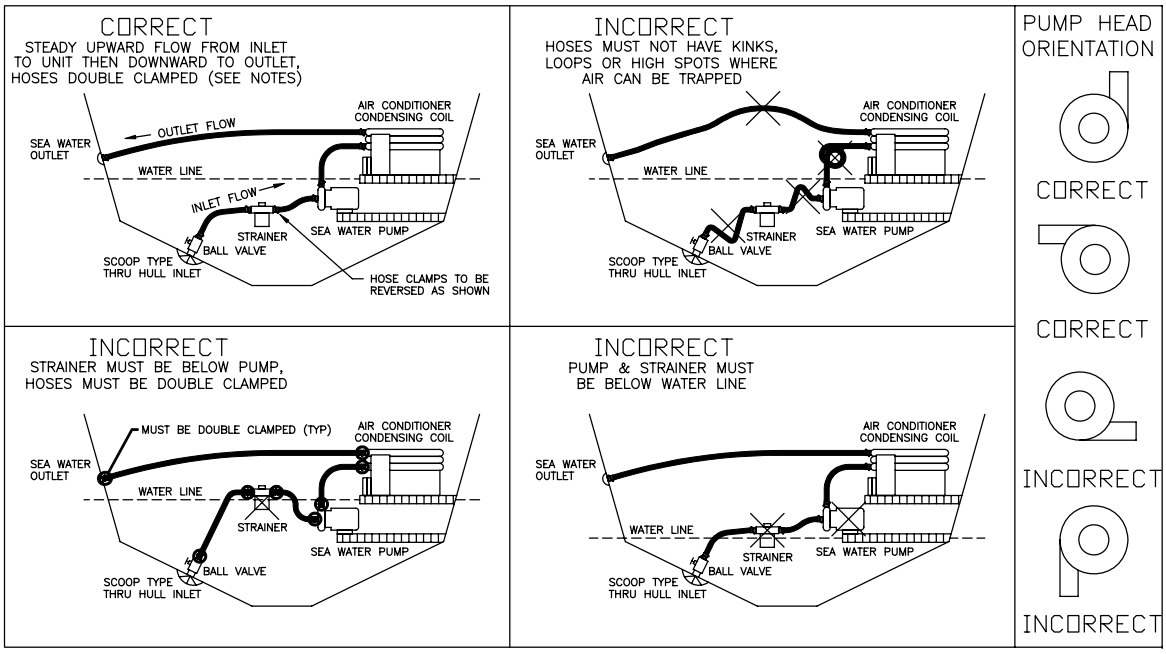
All ducting should:

- Be appropriately sized for each application
- Run as smoothly and taut as possible
- Have as few bends or loops as possible
- Be securely fastened to prevent sagging during boat operation
- Have all excess ducting lengths trimmed off
- Not be flattened or kinked
- Insulated when located in high heat load areas (hull side, mechanical compartments, etc.)
- Be properly protected against potential damage when routed through open areas

SEAWATER PUMP AND PLUMBING

Seawater temperature will directly affect the a/c unit's efficiency. This a/c unit can effectively cool your boat in water temperatures up to 90ºF and heat *(if* reverse cycle option is installed) in water as low as 40°F. Several guidelines should be followed during the installation of the seawater system. Since the circulation pump is centrifugal and not self-priming, it must be mounted so that it is always at least one foot below the water line regardless of which tack the vessel is on. The pump may be mounted horizontally or vertically, however the discharge must always be above the inlet. The pump head should be rotated toward the direction of water flow. ***Install the seawater speed scoop intake as far below the water line and as close to the keel as possible in any application, but especially on a sailboat, to keep the intake in the water so that air does not get into the system when the boat heels over.*** The speed scoop intake must face forward and not be shared with any other pump. A seacock (shut off valve) must be installed directly on the speed scoop outlet. A seawater strainer is mandatory between the seacock and pump. ***Failure to install a seawater strainer will void the pump warranty.*** The seawater system should be installed with an upward incline from the speed scoop & seacock, through the strainer, to the inlet of the pump and then up to the inlet of the a/c unit's condenser coil. The discharge from the a/c unit should then run to the seawater outlet through hull fitting which should be located where it can be visually checked for water flow and as close as practicable to the waterline to reduce noise. Use only reinforced marine grade hose. All hose connections shall use double/reversed stainless steel hose clamps. Below is a summary of the seawater system installation:

1. Install the speed scoop thru-hull inlet as close to the keel and as far below the waterline as possible, facing forward. Bed the scoop with a marine sealant designed for underwater use.
2. Install a bronze, full flow seacock on the speed scoop thru-hull inlet.
3. Install a seawater strainer below the level of the pump with access to filter.
4. Mount the pump at least one foot below the waterline and above the strainer.
5. Connect the seacock, strainer and pump with an uphill run of reinforced marine hose.
6. Connect the discharge from the pump uphill to the inlet of the a/c unit's condenser coil. And connect the outlet of the condenser coil to the overboard discharge thru-hull (seawater outlet).
7. Avoid loops, vertical bends (high spots) or the use of 90° elbows with seawater hose (each 90° elbow is equivalent to 2.5' of hose and a 90° elbow on the pump is equivalent to 20' of hose).
8. Double clamp all hose connections with stainless steel clamps, reversing the clamps.
9. Use threaded-seal tape on all threaded connections.
10. *Connect all metallic parts in contact with seawater to the vessel's bonding system including thespeed scoop inlet, strainer, pump, and the air conditioner.* ***Failure to do so will void warranty.***


CORRECT
STEADY UPWARD FLOW FROM INLET TO UNIT THEN DOWNWARD TO OUTLET, HOSES DOUBLE CLAMPED (SEE NOTES)
AIR CONDITIONER CONDENSING COIL
OUTLET FLOW
SEA WATER OUTLET
WATER LINE
INLET FLOW
STRAINER
SEA WATER PUMP
BALL VALVE
SCOOP TYPE THRU HULL INLET
HOSE CLAMPS TO BE REVERSED AS SHOWN
INCORRECT
HOSES MUST NOT HAVE KINKS, LOOPS OR HIGH SPOTS WHERE AIR CAN BE TRAPPED
INCORRECT
STRAINER MUST BE BELOW PUMP, HOSES MUST BE DOUBLE CLAMPED
MUST BE DOUBLE CLAMPED (TYP)
INCORRECT
PUMP & STRAINER MUST BE BELOW WATER LINE
PUMP HEAD ORIENTATION
CORRECT
CORRECT
INCORRECT
INCORRECT

NOTES:
1) THRU HULL INLET, BALL VALVE, HOSE AND STRAINER SHOULD BE SIZED NO SMALLER THAN PUMP INLET.
2) INSTALL THRU HULL FITTING AS FAR BELOW THE WATER LINE AS POSSIBLE.
3) PUMP NEEDS DEDICATED THRU HULL NOT SHARED WITH OTHER PUMPS.
4) AVOID OR MINIMIZE 90° ELBOW FITTINGS AS MUCH AS POSSIBLE, ROTATE PUMP HEAD TOWARDS DIRECTION OF WATER FLOW.

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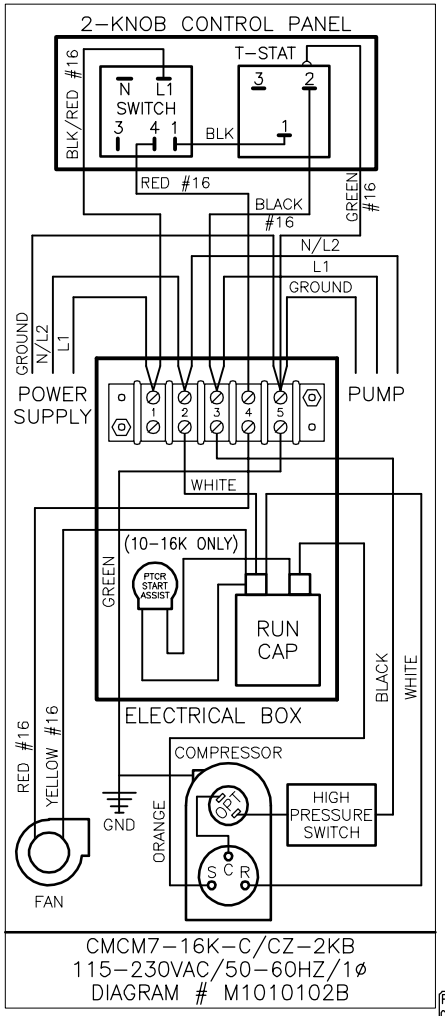
REV	DATE	REVISION	DWG	APR
A	8/29/01	ADDED NOTE TO PTCR,CAD859-01	DRR	RAP
B	9/21/01	ADD REVISION LEVEL TO LABEL-CAD946-01	BAP	R P

REFERENCE DWG(S) M1010059 FOR CMM7-16K



ALL WIRES ARE 12 GA UNLESS OTHERWISE NOTED.

CMCM7-16K-C/CZ-2KB
115-230VAC/50-60HZ/1ø
DIAGRAM # M1010102B

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06 Aug 02 - 03:28 pm

DATE:	12/20/99
PART NUMBER:	334445
SCALE:	N.T.S.
DRAWN BY:	RMW
APPROVED BY:	R P
DRAWING NO:	M1010102B

CABIN MATE 2000 WIRING DIAGRAM
CMCM7-16K-C/CZ-2KB
CABIN MATE STRAIGHT COOL 2-KNOB
115-230VAC/50-60HZ/1ø

Dometic Corporation
- Marine Air -
Cruisair - Marine Air - Grunert - Sentry - Tundra

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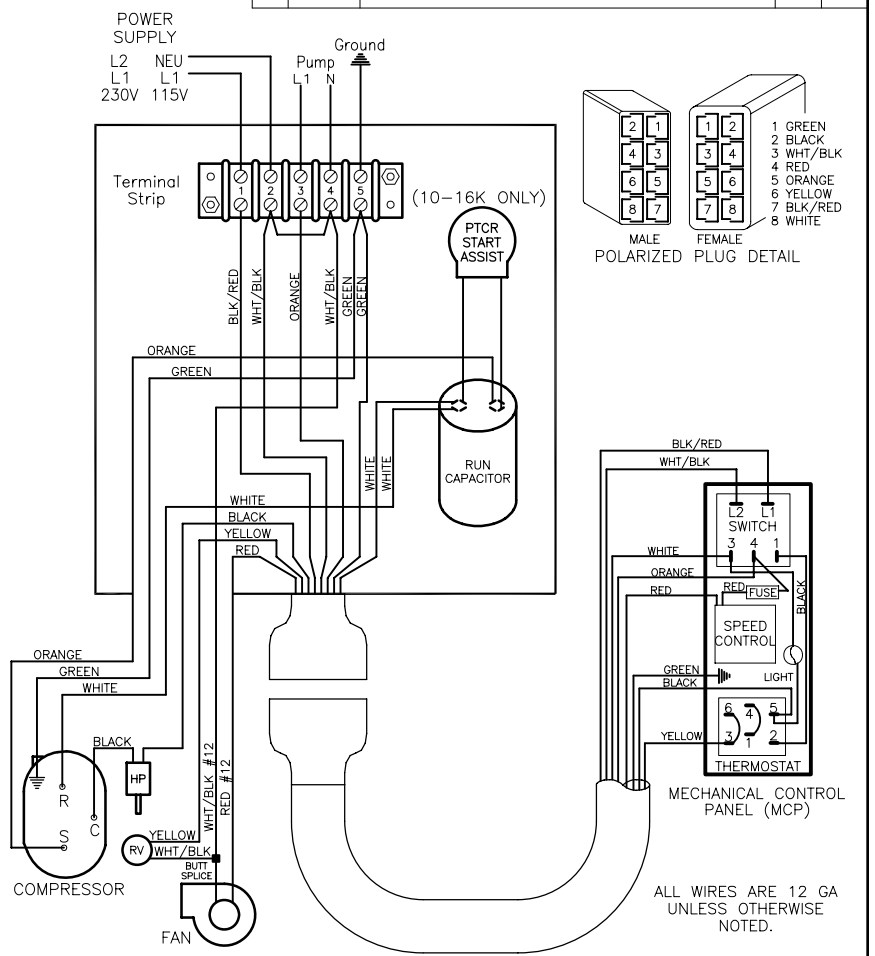
REV	DATE	REVISION DESCRIPTION	DWG	APR
A	8/29/01	ADDED NOTE TO PTCR,CAD859-01	DRR	RAP
B	6/15/04	REVISED FAN WIRE GAUGES TO #12,CAD403-04	DRR	MFG



ALL WIRES ARE 12 GA UNLESS OTHERWISE NOTED.

Dometic Corporation | Marine Air

CMCM7-16K(-Z)
CABIN MATE REV. CYCLE (MCP)

DATE: 12/20/99	DWG BY: RMW	PART NUMBER: 334447	DWG	M1010103	REV B
SCALE: NTS	APR BY: DD				

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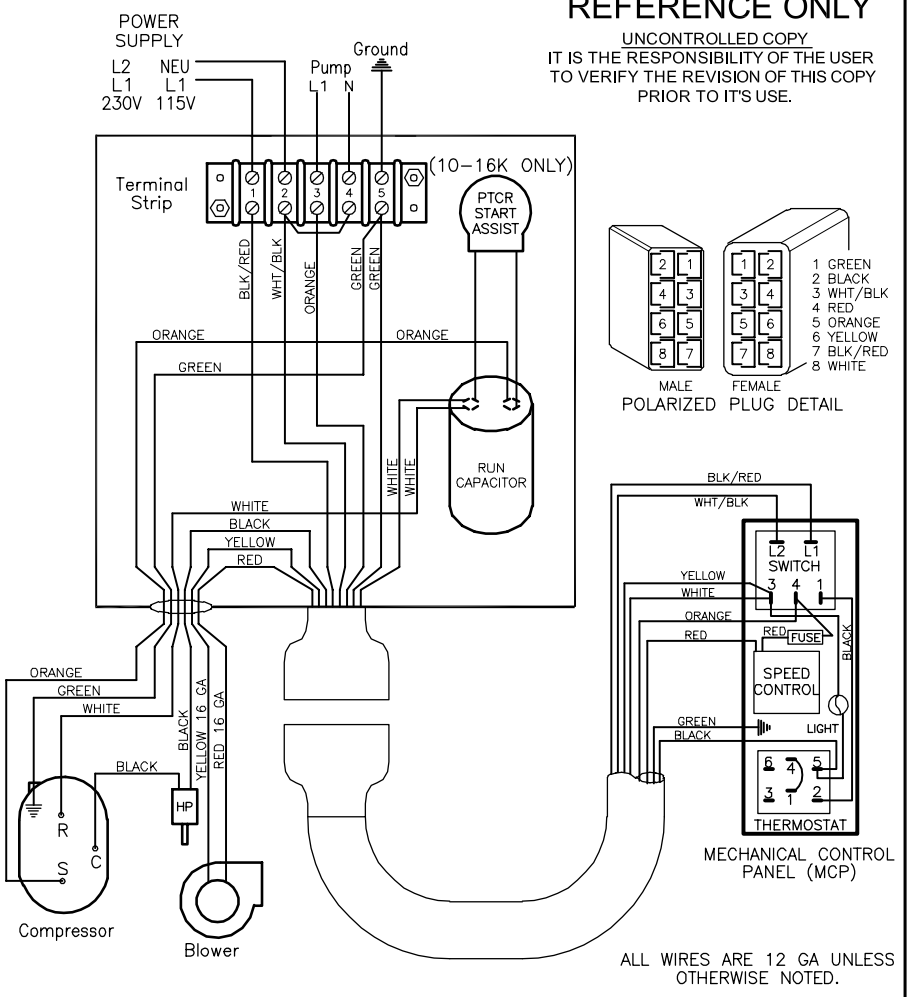

ALL WIRES ARE 12 GA UNLESS OTHERWISE NOTED.

DATE:	WIRING DIAGRAM	Dometic Corporation
12/20/99	CMCM7-16K-C/CZ	- Marine Air -
PART NUMBER: 334446	CABIN MATE STRAIGHT COOL (MCP)	
SCALE: N.T.S.	115-230VAC/50-60HZ/1ø	
DRAWN BY: RMW / APPROVED BY: R P	DRAWING NO: M1010104A	Cruisair - Marine Air - Grunert - Sentry - Tundra

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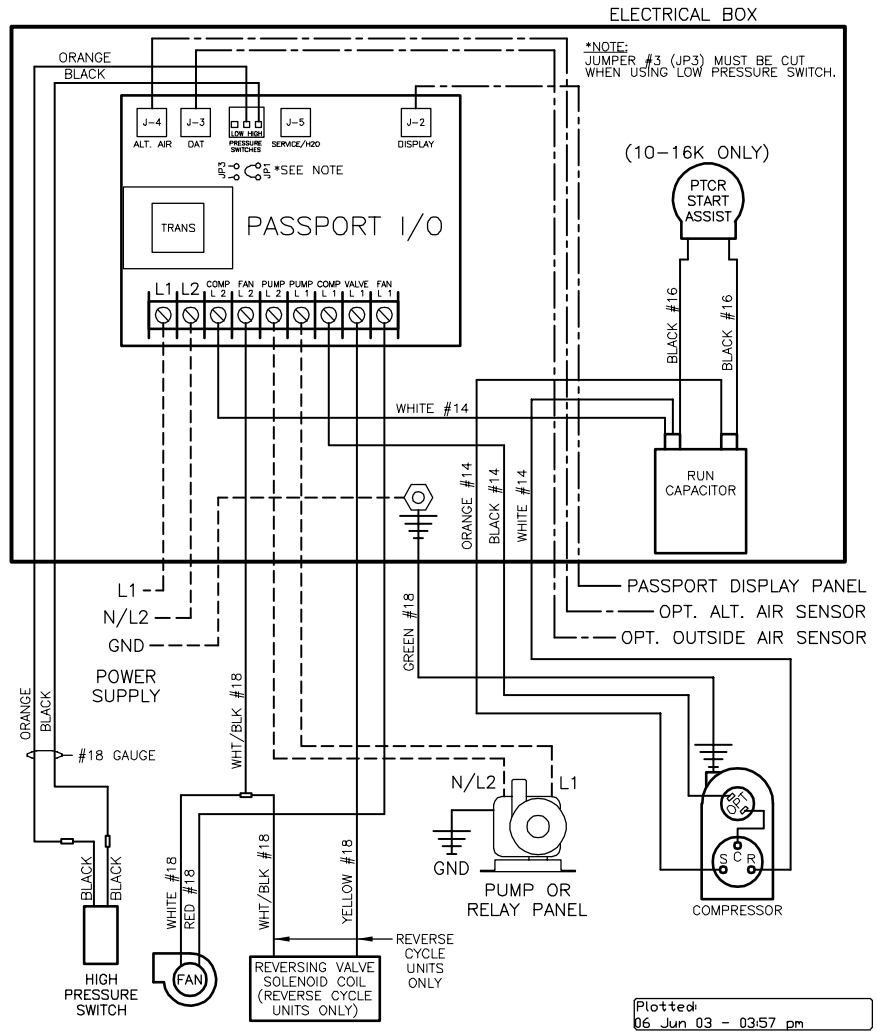
REV	DATE	REVISION	DWG	APR
A	1/14/03	REVISED FROM CMCP TO CMCD,CAD023-03	DRR	RAP
B	3/13/03	REVISED TITLE & ADDED PART NUMBER,CAD211-03	DRR	RAP
C	6/6/03	REVISED TITLE TO INCLUDE CMCD5K,CAD445-03	DRR	RAP



Plotted: 06 Jun 03 - 03:57 pm

DATE:	WIRING DIAGRAM	Dometic Corporation
12/05/02	CMCD5-16K(-Z/C/CZ)	- Marine Air -
PART NUMBER: 335552	CABIN MATE 2000 w/PASSPORT I/O	
SCALE: N.T.S.	115-230VAC/50-60HZ/1ø	
DRAWN BY: DRR / APPROVED BY: PJM	DRAWING NO: M1010119C	Cruisair - Marine Air - Grunert - Sentry - Tundra

ELECTRICAL CONNECTIONS, GROUNDING AND BONDING & ABYC STANDARDS

All a/c units have a terminal strip mounted either inside or outside the electric box. The terminal strip is labeled for proper connections of the electrical supply, ground wires and pump circuits. A wiring diagram is provided in the electrical box and in this manual. The wiring diagram in the electrical box supersedes the one in this manual. The correct size circuit breaker should be used to protect the system as specified on the a/c unit's data plate label. A minimum of 12 AWG boat cable should be used to supply power to the a/c unit and the seawater pump. All connections shall be made with ring or fork terminals. **Turn off a/c power supply circuit breaker before opening electrical box**.

Each a/c unit installed requires its own dedicated circuit breaker. If there is only one a/c unit installed, the seawater pump does not require a circuit breaker; the wiring from the seawater pump is connected to the terminal strip at the electrical box. If two or more a/c units use the same seawater pump, the pump wires will be connected to a pump relay panel (PRP) which in turn has its own dedicated circuit breaker sized for the pump (20 amp max). Please see the wiring diagram furnished with the PRP (NOTE: PRP triac must have mounting screw installed in order to dissipate heat). Connections in the bilge below the waterline should use heat shrink type butt splices.

Field wiring must comply with ABYC electrical codes. Power to the unit must be within the operating voltage range indicated on the data plate. Properly sized fuses or HACR circuit breakers must be installed for branch circuit protection. See data plate for maximum fuse/circuit breaker size (mfs) and minimum circuit ampacity (mca). All units must be effectively grounded to minimize the hazard of electrical shock and personal injury. The following are to be observed:

1. AC (alternating current) grounding (green wire) must be provided with the AC power conductors and connected to the ground terminal (marked "GRND") at the AC power input terminal block of the unit(s), per ABYC standard E-8, or equivalent.
2. Connections between the vessel's AC system grounding conductor (green wire) and the vessels DC (direct Current) negative or bonding system should be made as part of the vessel's wiring, per ABYC standard E9, or equivalent.
3. When servicing or replacing existing equipment that contains a chassis-mounted ground stud, the service person or installer must check the vessel's wiring for the existence of the connection required in item 2 above.

ABYC standards are available from: American Boat and Yacht Council
3069 Solomon's Island Rd.
Edgewater, MD 21036
Telephone: (410) 956-1050

The a/c unit must be connected to the vessel's bonding system to prevent corrosion due to stray electrical current or voltage. All pumps, metallic valves and fittings in the seawater circuit that are isolated from the a/c unit by PVC or rubber hoses must be individually bonded to the vessel's bonding system also. This will help eliminate any possibility of corrosion due to stray current or voltage.

FAILURE TO PROPERLY GROUND AND BOND THE SYSTEM WILL VOID WARRANTY!

MANUAL CONTROL PANELS (MCP) INSTALLATION

The MCP should be located within cap tube length of the CABIN MATE® unit. The cut out size for the 2 knob MCP is 2.5" wide by 4.5" tall. The 3 knob MCP is configured either vertically or horizontally. The cut out size is.2.5" by 7.0", see MCP for orientation. Once the cut out is made, carefully uncoil the copper cap tube with return air sensor (copper bulb) and route the control wires and cap tube through the hole and back to the unit ***using caution not to kink the cap tube.*** Mount the return air sensor into the clips provided on the evaporator coil. If the return air sensor cannot be mounted on the evaporator coil, mount it behind the return air grille. The sensor must be mounted in the return air stream. Make electrical connections according to the wiring diagrams.

INSTALLATION CHECKLIST (review prior to installation)

Seawater cooling system:

- o Speed scoop located as far below the waterline and as close to the keel as possible
- o Shut off valve and speed scoop properly sealed and tight
- o Seawater pump at least one foot below waterline and securely mounted
- o Strainer mounted below pump with access to filter
- o Double/reversed stainless steel hose clamps on all hose connections
- o Threaded-seal tape on all threaded connections
- o Hose runs uphill from speed scoop and seacock to strainer, pump and a/c unit, then downhill from a/c unit to overboard discharge
- o Water flowing freely from overboard discharge while pump is running

Mounting

- o **Not In engine room or bilge areas, must be sealed away from exhaust or fumes**
- o Proper spacing allowed around unit for hose and duct connections and for serviceability
- o Attached to solid level platform with hold down clips provided
- o Condensate drain routed aft and down hill to a sealed sump (not bilge)
- o Blower rotated toward supply air grille

Electrical

- o All butt connections on pump wire tightly crimped and heat shrunk
- o AC power source installed and grounded/bonded in accordance with ABYC standards
- o Control wires connected to terminal strip with fork or ring terminals
- o Circuit breakers sized according to specifications on the data plate label
- o Passport II display cable is connected at both ends
- o Pump Relay Panel (if used) has a dedicated circuit breaker sized for the pump but not to exceed 20 amps maximum

Grilles and Ducting

- o Supply air grille mounted as high as possible
- o Return air grille mounted as low and as close to the a/c unit as possible
- o Return air grille mounted away from bilge vapors or exhaust fumes
- o Ducting is pulled taut, straight, smooth and properly connected with no excess

OPERATION

OPERATIONS CHECKLIST

- o Ensure seawater intake ball valve is open
- o Turn on the a/c circuit breaker. If the seawater pump has its own circuit breaker, turn that on
- o Turn the system on
- o Set the desired cabin temperature (set point)
- o Check for a steady solid stream of water from the overboard discharge
- o Verify that there is steady airflow out of the supply air grille
- o If the unit does not appear to be operating properly, refer to troubleshooting guidelines

Note: Do not turn the unit off and immediately turn it back on. Allow at least 30 seconds for refrigerant pressure equalization.

MCP OPERATION: 3-KNOB (3KB) & 2-KNOB (2KB)

1) Ensure seawater intake ball valve (seacock) is open.
2) Turn SYSTEM SWITCH control knob to OFF.
3) Turn on a/c circuit breaker. If the sea water pump has its own circuit breaker, turn that on too.
4) Turn the SYSTEM SWITCH control knob to FAN (2KB) or START (3KB), this energizes the fan and seawater pump (3KB, see note). Turn THERMOSTAT control knob to the coolest position by rotating it fully clockwise. If system has reverse cycle, turn knob counter-clockwise for heat.
5) Turn FAN SPEED control knob to highest setting (3KB).
6) Verify that the fan is running and that there is steady airflow out of the supply air grille.
7) Turn the SYSTEM SWITCH to RUN, this will start the compressor and seawater pump (2KB, see note). The indicator light on the 3KB control will illuminate.
8) Check for a steady solid stream of seawater from the overboard discharge.
9) To set the thermostat, allow sufficient time for the unit to cool/heat the area to the desired temperature. When the area is sufficiently cooled/heated, turn the thermostat knob slowly toward the center position until it clicks once (the indicator light on the 3KB will turn off). The thermostat is now set to maintain a constant temperature. While heating, if the ambient temperature is less than 50°F (10°C), set the FAN SPEED control knob to low (3KB) for five to ten minutes until the unit begins to heat well, then increase the fan speed for more heat output.

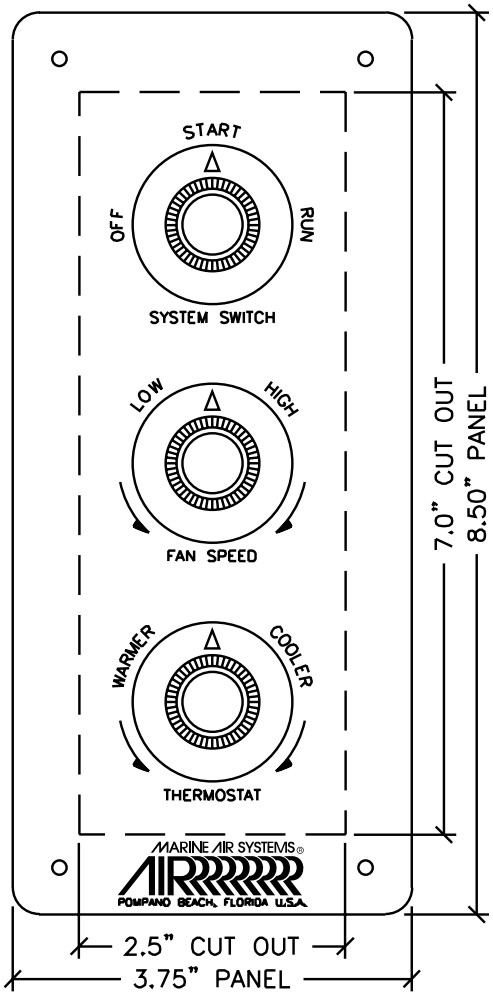
Note: The seawater pump comes on with the fan on the 3KB (switch set to START) and with the compressor on the 2KB (switch set to RUN).

The thermostat on the MCP control panel serves to cycle the compressor on and off and provide an automatic changeover from cooling to heating (reverse cycle only) with a 3.5°F (6.3°C) differential. Rotating the thermostat to the left after it has been set for cooling will cause the unit to heat. If you rotate the thermostat to the right, the unit will cool. If the thermostat is left stationary after being set, the unit will cycle from cooling to neutral, or heating to neutral depending on the requirement.

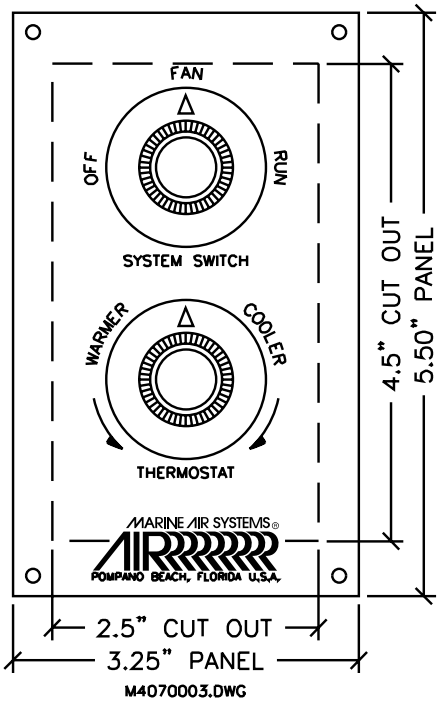
IMPORTANT NOTE: Reverse cycle units have a reversing valve that must be energized periodically to keep the internal parts moving freely. To accomplish this, switch the a/c into HEAT for a few seconds once a month.

Note: Do not turn the unit off and immediately turn it back on. Wait at least 30 seconds for system refrigerant pressures to balance.

3 KNOB CONTROL (MCP)



2 KNOB CONTROL (MCP2KB)



MAINTENANCE

Seawater Strainer

Insure that your pump receives adequate seawater flow by regularly cleaning the strainer basket. Periodically check the overboard discharge for a steady stream of water. Check seawater intake speed scoop for obstructions. Make sure hoses are not looped, kinked or crushed.

Condenser Coil Cleaning

Coils can become fouled over a period of time due to marine growth or scale build-up. This both obstructs water flow and prohibits proper heat transfer. To clean coils, using a chemical pump, flush with a 5% muriatic or hydrochloric acid and fresh water solution. Disconnect system hoses and check for fouling. Pump solution through coil (and hoses if need be) until clean. Rinse with fresh water and reconnect hoses. Follow manufacturer's safety guidelines for all cleaning solutions.

Return Air Filters

Check the return air filter about once a month and clean as necessary. To clean the filter, remove it from the unit, rinse with water, air dry and reinstall.

Winterization

There are several methods of winterization, some of which work better than others. The four various methods employed using a 50/50 non-polluting biodegradable anti-freeze/water solution are:

1. Pumping of anti-freeze solution into the overboard thru-hull fitting, and discharging through the intake thru-hull fitting, if the boat is out of water. If the boat is in the water then the thru-hull should be closed and the system drained then filled back to the unit outlet.
2. Use of the seawater pump to pump anti-freeze solution through the system and discharging through the overboard thru-hull fitting. Close seacock, remove hose from strainer discharge, raise hose above pump (so pump does not lose its prime) and pour in anti-freeze solution. Pump solution through system. The strainer and hose to seacock will also need to be drained of water.
3. Use of pressurized air injected at the overboard discharge fitting and the water being discharged through the seawater intake fitting.
4. Use of pressurized air to force water from the intake through the overboard discharge.

Note: Collect all discharged liquids and recycle or dispose of in a proper manner.

Any method that causes the anti-freeze solution to flow downward is the method of choice. By this means, the anti-freeze solution will displace any water trapped and eliminate the possibility of freezing in hidden areas.

In addition, since the seawater pump utilizes a magnetically driven impeller, the impeller should be removed from the wet end assembly, wiped with an alcohol solution, and stored in a warm, dry area until commissioning takes place.

GENERAL TROUBLESHOOTING

Also see specific digital or mechanical control troubleshooting sections following these general guidelines.

Fault: Will not start.

Possible Reason/Correction

1. **Air conditioning circuit breaker is off.**
   Turn circuit breaker on at ship's panel.

2. **Control is not turned on.**
   See mechanical control section of this manual for MCP controls, or see the digital control manual for Elite or Passport I/O controls.

3. **Wrong wiring at terminal strip.**
   Check wiring diagram and correct if necessary.

4. **Push-on butt connectors became disconnected during installation.**
   Disconnect power supply and open electric box, check wiring diagram, correct if necessary

5. **Input line voltage is insufficient.**
   Check power source (shore/generator) for proper voltage. Check wiring and terminals for proper sizes and connections. Verify with a voltmeter that the power at the unit is the same as the power source.

Fault: Fan is not running.

Check specific control troubleshooting section.

Fault: No cooling or heating.

Possible Reason/Correction

1. **Temperature set point is satisfied.**
   Lower or raise set point.

2. **Obstructed seawater flow.**
   Clean seawater strainer. Check for obstructions at speed scoop thru-hull inlet. Check for a good steady flow from the overboard discharge.

3. **Seawater pump may be air-locked.**
   Remove hose from pump discharge to purge air from line.

4. **Loss refrigerant gas.**
   Check air conditioning unit for refrigerant oil leakage, call service technician.

5. **Seawater temperature too high for cooling or too low for heating.**
   Seawater temperature will directly affect air conditioning unit's efficiency. This air conditioning unit can effectively cool your boat in water temperature up to 90°F (32.2°C) and heat (if reverse cycle option is installed) in water as low as 40°F (4.4°C).

6. **Fan coil is iced (in cooling).**
   Check your specific control troubleshooting section.

7. **Fan is not running.**
   Check your specific control troubleshooting section.

8. **Seawater plumbing is air-locked.**
   Ensure that seawater plumbing is installed per the guidelines in this manual.

9. **Digital control is programmed for Cool or Heat only, or mechanical control thermostat is rotated too far towards either Cooler or Warmer setting.**
   See digital control manual for reprogramming or see mechanical control operation section in this manual.

10. **High pressure switch open (in cooling) due to improper seawater flow.**
    Strainer or intake may be plugged, seacock may be closed, check seawater hose for kinks or collapses. Verify pump operation. Check the pump circuit breaker if applicable.

11. **High pressure switch open (in heating) due to improper airflow.**
    Remove any obstructions in return air stream. Clean return air filter and grille. Check for crushed or restricted ducting, ducting must be as straight, smooth and taut as possible.

12. **High-pressure switch is open in heating mode.**
    System may cycle on high-pressure if seawater temperature is above 55°F (12.8°C).

13. **Compressor's thermal overload is open due to either of the above reasons.**
    Compressor needs to cool down. Turn system off for a while (it may take up to three hours to reset thermal overload).

Fault: No heating.

Possible Reason/Correction

1. **Unit is "cool only", or if reverse cycle, reversing valve may be stuck.**
   Tap reversing valve lightly with rubber mallet while unit is in heat mode. Call for service if that does not correct the problem.

Fault: Low airflow.

Possible Reason/Correction

1. **Airflow is blocked.**
   Remove any obstructions in return air stream. Clean return air filter and grille. Check for crushed or restricted ducting, ducting must be as straight, smooth and taut as possible.

2. **Fan coil is iced.**
   See below.

Fault: Fan coil is iced.

Possible Reason/Correction

1. **Thermostat set point is too low.**
   Raise set point.

2. **Improper airflow.**
   Remove any obstructions in return air stream. Clean return air filter and grille. Check for crushed or restricted ducting, must be as straight, smooth and taut as possible. See the Digital Controls Troubleshooting section below for reprogramming options.

3. **Supply air is short-cycling.**
   Redirect supply air so that it is not blowing into the return air stream. Seal any air leaks on duct.

4. **Humidity level too high.**
   Close hatches and doors.

5. **When all else fails.**
   Switch air conditining to heat until ice melts or use hair dryer to melt.

Fault: Water coil is iced in the heating mode.

Possible Reason/Correction

1. **Seawater temperature is below 40°F 4.4°C.**
   Shut down system to prevent damage to condenser. Allow coil to defrost.

Fault: System runs continuously.

Possible Reason/Correction

1. **Set point temperature is improperly set: too low for cooling or too high for heating.**
   Raise or lower set point.

2. **Porthole or hatches open.**
   Close all port holes and hatches.

3. **Seawater temperature too high for cooling or to low for heating.**
   Seawater temperature will directly affect the a/c unit's efficiency. This a/c unit can effectively cool your boat in water temperatures up to 90°F (32.3°C) and heat (if reverse cycle option is installed) in water as low as 40°F (4.4°C).

4. **Improper air sensor location.**
   Check your specific control troubleshooting section.

Digital Controls Troubleshooting

Fault: Digital display panel is not lit.

Possible Reason/Correction

1. **8-pin display cable plugs are not making contact (unplugged, dirty, bent, or broken pins).**
   With POWER OFF at the circuit breaker, remove connector and inspect. If damaged, replace connector or entire display cable.

Fault: Fan is not running or runs continuously.

Possible Reason/Correction

1. **Digital control is programmed for either fan cycling with compressor or continuous fan operation.**
   Elite Control: Press and hold the fan button for five seconds to change to "con" so fan will stay on continuously or to "CYC" so the fan cycles with the compressor.

   Passport I/O Control: Reprogram parameter P-14.

   Note: After the compressor cycles off, the fan will continue to run for two minutes in Cool Mode and four minutes in Heat Mode regardless of parameter setting.

Fault: Fan is not running but the compressor is.

Possible Reason/Correction

1. **Failed triac on Passport I/O circuit board.**
   Send for repair or call local service technician (see distributor listing).

Fault: Fan runs continuously although it is set to cycle with compressor.

Possible Reason/Correction

1. **Failed triac on Passport I/O circuit board.**
   Send for repair or call local service technician (see distributor listing).

Fault: No cooling or heating.

Possible Reason/Correction

1. **Digital control programmed for heat or cool only.**
   Elite Control: Press and release the Mode button (bottom right corner of display) until the desired mode LED is lit.

   Passport I/O Control: Reprogram parameter P-1.

2. **"HPF" or "LPF" is displayed.**
   See below.

Fault: No heat.

Possible Reason/Correction

1. **Digital Control may be set to Electric Heat, not Reverse Cycle.**
   Elite Control: Reprogram parameter P-13

   Passport I/O Control: Reprogram parameter P-15

Fault: Unit switches to heat while in cool mode.

Possible Reason/Correction

1. **De-icing feature enabled due to coil icing up.**
   Elite Control: Reprogram parameter P-7

   Passport I/O Control: Reprogram parameter P-8

Fault: Fan coil is iced.

Possible Reason/Correction

1. **Improper airflow.**
   See the General Troubleshooting section above first, before reprogramming digital control.

   Reprogram parameter P-7 for Elite or P-8 for Passport I/O. If de-icing cycle does not melt ice, switch air conditioning unit to heat until ice melts or use hair dryer to melt ice.

   If problem persists, reprogram Low Fan Speed Limit for maximum value. Set P-2 to 55 for Elite or set P-3 to 64 for Passport I/O.

Fault: System runs continuously.

Possible Reason/Correction

1. **Improper air sensor location.**
   Verify display head location with criteria found in the control manual. Install alternate air sensor if necessary.

Fault: "HPF" is displayed.

Possible Reason/Correction

1. **High-pressure switch is open (in cooling) due to improper seawater flow.**
   Strainer or intake may be plugged, seacock may be closed, check seawater hose for kinks or collapses. Verify pump operation; check pump circuit breaker if applicable.

2. **High-pressure switch open (in heating) due to improper airflow.**
   Remove obstructions in return air stream. Clean air filter and grille. Check for crushed or restricted ducting, ducting must be as straight, smooth and taut as possible.

   If problem persists, reprogram Low Fan Speed Limit for maximum value. Set P-2 to 55 for Elite or set P-3 to 64 for Passport I/O. And, set the Reverse Fan Speeds During Heating Mode parameter to “rEF” (P-12 for Elite or P-13 for Passport I/O), or manually set fan speed to high.

Fault: “LPF” is displayed.

Possible Reason/Correction

1. **Low-pressure switch is open due to low seawater and/or low return air temperatures.**
   Try restarting the a/c unit; the optional low-pressure switch has a ten minute shutdown time delay that may be in affect.

2. **Low pressure switch is open due to loss of refrigerant.**
   Check air conditioning unit for refrigerant oil leakage, call service technician.

Fault: “ASF” is displayed.

Possible Reason/Correction

1. **Indicates failed faceplate air sensor, alternate air sensor or display cable.**
   Unplug alternate air sensor if installed or plug in alternate air sensor if not installed. Try another display cable.

2. **Damaged jack/socket in display head or on circuit board.**
   Visually check to see that pins inside socket are not bent or corroded. Repair or replace display or circuit board if needed.

Fault: “PLF” is displayed (Elite Digital Control only).

Possible Reason/Correction

1. **Indicates that seawater flow through the condenser coil is insufficient.**
   Check for adequate seawater flow. Verify pump operation. Inspect the condenser coil; it may need cleaning (see MAINTENANCE section). Sensor may be faulty, replace if necessary. Call for service technician.

MCP Mechanical Control Panel

Fault: Fan is not running.

Possible Reason/Correction

1. **3-Knob MCP system switch is not set properly.**
   Set MCP system switch to “START” for fan only or “RUN” for cooling and heating (if reverse cycle).

2. **3-Knob MCP fuse blown.**
   Replace 10-amp fuse behind MCP panel.

3. **2-knob MCP system switch is not set properly.**
   Set system switch to “FAN” for fan only or “COOL” for cooling and heating.

4. **Wire became disconnected or loosened during installation.**
   Reconnect or tighten, verify with wring diagram in this manual.

Fault: System runs continuously.

Possible Reason/Correction

1. **Improper MCP air sensor location.**
   Verify return air sensing bulb location with criteria found in this manual.

Fault: No cooling or heating.

Possible Reason/Correction

1. **High-pressure switch is open (in cooling) due to improper seawater flow.**
   Strainer or intake may be plugged, seacock may be closed, check seawater hose for kinks or collapses. Verify pump operation. Check the pump circuit breaker if applicable.

2. **High-pressure switch open (in heating) due to improper airflow.**
   Remove any obstructions in return air stream. Clean return air filter and grille. Check for crushed or restricted ducting, ducting must be as straight, smooth and taut as possible.

3. **MCP is not set properly.**
   3-knob should be set to “RUN”. 2-knob should be set to “COOL”.

MANUFACTURERS LIMITED WARRANTY AGREEMENT

The following warranty is extended to cover the Marine Air Systems (MAS) **CABIN MATE** ® series of self contained air conditioners manufactured or supplied by Dometic Corporation (Dometic), and is subject to qualifications as indicated. Dometic warrants for the periods set forth below that products manufactured or supplied by it will be free from defects in workmanship and material, provided such products are installed, operated and maintained in accordance with Dometic's written instructions.

ALL IMPLIED WARRANTIES INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED TO THE TERMS AND PERIODS OF WARRANTY SET FORTH BELOW AND, TO THE EXTENT PERMITTED BY LAW, ANY AND ALL IMPLIED WARRANTIES ARE EXCLUDED.

Components comprising a complete system on a new installation are covered as follows:

Equipment bought through a catalog is covered by a limited one (1) year warranty from the date of purchase, but not to exceed two (2) years from date of manufacture. Labor costs are covered for six (6) months from the date of purchase. Travel costs are not covered.

Equipment installed by an OEM is covered by a limited one (1) year warranty from the date of purchase of the vessel, but not to exceed two (2) years from date of manufacture. Labor and travel costs are covered for one (1) year from the date of purchase of the vessel.

Equipment installed by a MAS authorized dealer is covered by a limited one (1) year warranty from the date of installation, but not to exceed two (2) years from date of manufacture. Labor costs are covered for six (6) months from the date of installation. Travel costs are not covered.

Warranty will be paid in accordance with our established schedule of allowances. **Compensation for warranty repairs is only made to Dometic authorized service companies.**

Dometic will repair or replace at its option, components found to be defective due to faulty materials or workmanship, when such components, examined by an authorized service dealer or a factory service representative, are found to have a defect for which the company is responsible. In addition, Dometic will pay labor costs as outlined in its Schedule of Limited Warranty Allowances for removal and reinstallation of such components. Replacement components are warranted for the duration of the remaining warranty period in effect on the original component. In the event that a unit has to be returned to the factory, it must be properly packaged to prevent shipping damages. If packaging is not available, Dometic will provide it at no charge. The warranty may be voided on any piece of equipment or component that is damaged due to improper packaging.

This limited warranty is extended in lieu of all other warranties, agreements or obligations, expressed or implied, concerning Marine Air Systems' components. This limited warranty is extended only to the original purchaser and is not transferable. This warranty shall be governed by the laws of the State of Florida and gives the original first end user definite legal rights.

This warranty does not cover damages incidental and or consequential to the failure of Marine Air Systems' equipment including but not limited to; normal wear, accident, misuse, abuse, negligence, improper installation, lack of reasonable and necessary maintenance, alteration, civil disturbance or act of God.

No person or dealer is authorized to extend any other warranties or to assume any other liabilities on Dometic's behalf, unless made or assumed in writing by an officer of Dometic.

Marine Air Worldwide Service Dealer Locator

The majority of the service listings displayed for the United States are key members of the national Marine Air distributor network. If you need service, please contact the closest company shown. In most cases they will direct you to a local dealer or service port. We have over 500 Marine Air dealers in the national Marine Air network, and one should be convenient to you.

The **international** companies listed are, in many cases, distributors and are capable of managing the majority of service requests for the countries listed. In some cases they will refer you to a local dealer.

You may also contact us directly via the web site or call us in the US at (954) 973-2477.

For a complete and up-to-date Dealer locator list, please visit our website at http://www.marineair.com/locator/index.html

USA

Alabama

AER Marine Supply
Location: Seabrook, Texas, USA
Phone: (281) 474-3276
Fax: (281) 474-2714
E-mail: richard.miller@aersupply.com
Web: www.aersupply.com

Alaska

American Marine Contractors
Location: Seattle, Washington, USA
Phone: (206) 660-2240
Fax: (206) 548-5008
E-mail: Cliff@nwmarineair.com

Arizona

Southern California Marine Enterprises
Location: San Diego, California, USA
Phone: 619-224-2869
Fax: 619-226-0496
E-mail: sales@southerncalmarine.com
Web: www.southerncalmarine.com

Arkansas

AER Marine Supply
Location: Seabrook, Texas, USA
Phone: (281) 474-3276
Fax: (281) 474-2714
E-mail: richard.miller@aersupply.com
Web: www.aersupply.com

California

Southern California Marine Enterprises
Location: San Diego, California, USA
Phone: 619-224-2869
Fax: 619-226-0496
E-mail: sales@southerncalmarine.com
Web: www.southerncalmarine.com

Colorado

AER Marine Supply
Location: Seabrook, Texas, USA
Phone: (281) 474-3276
Fax: (281) 474-2714
E-mail: richard.miller@aersupply.com
Web: www.aersupply.com

Connecticut

Ocean Options
Location: Tiverton, Rhode Island, USA
Phone: (401) 624-7334
Fax: (401) 624-8050
E-mail: Sales@oceanoptions.com
Web: www.oceanoptions.com

Delaware

Ocean Options - Mid Atlantic
Location: Annapolis, Maryland, USA
Phone: (410) 268-9365
Fax: (410) 268-8199
E-mail: Sales@oceanoptions.com
Web: www.oceanoptions.com

Florida, North & Panhandle

Beard Marine Savannah - Distributor
Location: Savannah, Georgia, USA
Phone: (912) 356-5222
Fax: (912) 692-1006
E-mail: infosavannah@beardmarine.com
Web: www.beardmarine.com

Florida, Southeast

A A Mabru, Inc. - Dealer
Location: Miami, Florida, USA
Territory: Miami
Phone: 305-634-8063
Fax: 305-634-0906
E-mail: mabru@mabru.com
Web: http://www.mabru.com/air_conditioning/

Aquae Marine Systems - Dealer
Location: Ft. Lauderdale, Florida, USA
Phone: 954-683 8112
Fax: 954-462-8108
E-mail: paul@aquaemarine.com
Web: www.aquaemarine.com

ARW/Heinen & Hopman - Dealer
Location: Ft. Lauderdale, Florida, USA
Territory: Fort Lauderdale
Phone: (954) 463-0110
Fax: (954) 522-1139
E-mail: info@arwmaritime.com
Web: www.heinenhopman.com

Beard Marine - Ft. Lauderdale - Dealer
Location: Ft. Lauderdale, Florida, USA
Territory: Fort Lauderdale
Phone: (954) 463-2288
Fax: (954) 527-0362
E-mail: info@beardmarine.com
Web: www.beardmarine.com

Beard Marine of the Palm Beaches - Dealer
Location: Riviera Beach, Florida, USA
Territory: Riviera Beach
Phone: (561) 881-9598
Fax: (561) 881-9599
E-mail: bmpb@beardmarine.com

Cable Marine - Dealer
Location: Ft. Lauderdale, Florida, USA
Territory: Fort Lauderdale
Phone: (954) 462-2840
Fax: (954) 523-3686
E-mail: eastyard@cablemarine.com
Web: www.cablemarine.com

Comfort Marine - Dealer
Location: Ft. Lauderdale, Florida, USA
Territory: Ft. Lauderdale
Phone: (954) 257-9848
Fax: (954) 689-7332

Cowherd Marine - Dealer
Location: Lake Park, Florida, USA
Territory: West Palm Beach
Phone: (561) 844-1666
Fax: (561) 844-1628
E-mail: cowherdmarine@comcast.net

Florida, Southeast

Dometic Environmental Corporation, Distributor
Location: Pompano Beach, Florida, USA
Territory: South Florida
Phone: (954) 973-2477
Fax: (954) 979-4414
E-mail: sales@dometicenviro.com
Web: www.dometicenviro.com

Edd Helms Marine Air Conditioning - Dealer
Location: Miami, Florida, USA
Territory: Ft. Lauderdale, Miami
Phone: 954 522 2520
Fax: 954 522 1331
E-mail: srogers@eddhelms.com
Web: www.EddHelmsMarine.com.

Marine Air Conditioning - Dealer
Location: Ft. Pierce, Florida, USA
Territory: Port St. Lucie
Phone: (772) 464-7896
Fax: (772) 464-8697

Masters Marine Center, Inc. - Dealer
Location: Miami, Florida, USA
Territory: Miami
Phone: (305) 871-7111
Fax: (305) 871-0214
E-mail: mastersmarine@aol.com

Neptune Air Corporation - Dealer
Location: Ft. Lauderdale, Florida, USA
Territory: Fort Lauderdale
Phone: (954) 779-2510
Fax: (954) 779-2732

Sea Air Land Technologies - Dealer
Location: Marathon, Florida, USA
Territory: Florida Keys
Phone: (305) 289-1150
Fax: (305) 289-0275
E-mail: saltmail@salt-systems.com
Web: www.salt-systems.com

Sea Breeze Marine - Dealer
Location: Lighthouse Point, Florida, USA
Territory: Lighthouse Point
Phone: (954) 427-3843
Fax: (561) 368-0463

Seafarer Marine Supply Inc
Location: Largo, Florida, USA
Territory: Tampa-St Petersburg
Phone: (727) 595-8813
Fax: (727) 595-5557
E-mail: ttomalo@aol.com

Florida, Southwest

Cruisair Suncoast, Inc.
Location: St. Petersburg, Florida, USA
Phone: 727-526-7875
Fax: 727-528-9519
E-mail: cruisairsuncoast@yahoo.com

Georgia

Beard Marine Savannah - Distributor

Location: Savannah, Georgia, USA
Phone: (912) 356-5222
Fax: (912) 692-1006
E-mail: infosavannah@beardmarine.com
Web: www.beardmarine.com

Hawaii

Southern California Marine Enterprises

Location: San Diego, California, USA
Phone: 619-224-2869
Fax: 619-226-0496
E-mail: sales@southerncalmarine.com
Web: www.southerncalmarine.com

Idaho

American Marine Contractors

Location: Seattle, Washington, USA
Phone: (206) 660-2240
Fax: (206) 548-5008
E-mail: Cliff@nwmarineair.com

Illinois

Midwest Marine Supply

Location: St. Clair Shores, Michigan, USA
Phone: (586) 778-8950
Fax: (586) 778-6108
E-mail: sales@midwestmarinesupply.com
Web: www.midwestmarinesupply.com

Indiana

Midwest Marine Supply

Location: St. Clair Shores, Michigan, USA
Phone: (586) 778-8950
Fax: (586) 778-6108
E-mail: sales@midwestmarinesupply.com
Web: www.midwestmarinesupply.com

Iowa

Midwest Marine Supply

Location: St. Clair Shores, Michigan, USA
Phone: (586) 778-8950
Fax: (586) 778-6108
E-mail: sales@midwestmarinesupply.com
Web: www.midwestmarinesupply.com

Kansas

AER Marine Supply

Location: Seabrook, Texas, USA
Phone: (281) 474-3276
Fax: (281) 474-2714
E-mail: richard.miller@aersupply.com
Web: www.aersupply.com

Kentucky

Midwest Marine Supply

Location: St. Clair Shores, Michigan, USA
Phone: (586) 778-8950
Fax: (586) 778-6108
E-mail: sales@midwestmarinesupply.com
Web: www.midwestmarinesupply.com

Louisiana

AER Marine Supply

Location: Seabrook, Texas, USA
Phone: (281) 474-3276
Fax: (281) 474-2714
E-mail: richard.miller@aersupply.com
Web: www.aersupply.com

Maine

Ocean Options

Location: Tiverton, Rhode Island, USA
Phone: (401) 624-7334
Fax: (401) 624-8050
E-mail: Sales@oceanoptions.com
Web: www.oceanoptions.com

Maryland

Ocean Options - Mid Atlantic

Location: Annapolis, Maryland, USA
Phone: (410) 268-9365
Fax: (410) 268-8199
E-mail: Sales@oceanoptions.com
Web: www.oceanoptions.com

Massachusetts

Ocean Options

Location: Tiverton, Rhode Island, USA
Phone: (401) 624-7334
Fax: (401) 624-8050
E-mail: Sales@oceanoptions.com
Web: www.oceanoptions.com

Michigan

Midwest Marine Supply

Location: St. Clair Shores, Michigan, USA
Phone: (586) 778-8950
Fax: (586) 778-6108
E-mail: sales@midwestmarinesupply.com
Web: www.midwestmarinesupply.com

Minnesota

Midwest Marine Supply

Location: St. Clair Shores, Michigan, USA
Phone: (586) 778-8950
Fax: (586) 778-6108
E-mail: sales@midwestmarinesupply.com
Web: www.midwestmarinesupply.com

Mississippi

AER Marine Supply

Location: Seabrook, Texas, USA
Phone: (281) 474-3276
Fax: (281) 474-2714
E-mail: richard.miller@aersupply.com
Web: www.aersupply.com

Missouri

AER Marine Supply

Location: Seabrook, Texas, USA
Phone: (281) 474-3276
Fax: (281) 474-2714
E-mail: richard.miller@aersupply.com
Web: www.aersupply.com

Montana

American Marine Contractors

Location: Seattle, Washington, USA
Phone: (206) 660-2240
Fax: (206) 548-5008
E-mail: Cliff@nwmarineair.com

Nevada

AER Marine Supply

Location: Seabrook, Texas, USA
Phone: (281) 474-3276
Fax: (281) 474-2714
E-mail: richard.miller@aersupply.com
Web: www.aersupply.com

New Hampshire

Ocean Options

Location: Tiverton, Rhode Island, USA
Phone: (401) 624-7334
Fax: (401) 624-8050
E-mail: Sales@oceanoptions.com
Web: www.oceanoptions.com

New Jersey

Marine Specialists

Location: Ronkonkoma, New York, USA
Territory: New York, New Jersey
Phone: (631) 580-0545
Fax: (631) 580-0551
E-mail: Sales@marinespecialists.com
Web: www.marinespecialists.com

New Mexico

AER Marine Supply

Location: Seabrook, Texas, USA
Phone: (281) 474-3276
Fax: (281) 474-2714
E-mail: richard.miller@aersupply.com
Web: www.aersupply.com

New York

Marine Specialists

Location: Ronkonkoma, New York, USA
Territory: New York, New Jersey
Phone: (631) 580-0545
Fax: (631) 580-0551
E-mail: Sales@marinespecialists.com
Web: www.marinespecialists.com

North Carolina

Beard Marine Savannah - Distributor

Location: Savannah, Georgia, USA
Phone: (912) 356-5222
Fax: (912) 692-1006
E-mail: infosavannah@beardmarine.com
Web: www.beardmarine.com

North Dakota

Midwest Marine Supply

Location: St. Clair Shores, Michigan, USA
Phone: (586) 778-8950
Fax: (586) 778-6108
E-mail: sales@midwestmarinesupply.com
Web: www.midwestmarinesupply.com

Ohio

Midwest Marine Supply

Location: St. Clair Shores, Michigan, USA
Phone: (586) 778-8950
Fax: (586) 778-6108
E-mail: sales@midwestmarinesupply.com
Web: www.midwestmarinesupply.com

Oklahoma

AER Marine Supply

Location: Seabrook, Texas, USA
Phone: (281) 474-3276
Fax: (281) 474-2714
E-mail: richard.miller@aersupply.com
Web: www.aersupply.com

Oregon

American Marine Contractors

Location: Seattle, Washington, USA
Phone: (206) 660-2240
Fax: (206) 548-5008
E-mail: Cliff@nwmarineair.com

Pennsylvania

Ocean Options - Mid Atlantic

Location: Annapolis, Maryland, USA
Phone: (410) 268-9365
Fax: (410) 268-8199
E-mail: Sales@oceanoptions.com
Web: www.oceanoptions.com

Rhode Island

Ocean Options

Location: Tiverton, Rhode Island, USA
Phone: (401) 624-7334
Fax: (401) 624-8050
E-mail: Sales@oceanoptions.com
Web: www.oceanoptions.com

South Carolina

Beard Marine Savannah - Distributor

Location: Savannah, Georgia, USA
Phone: (912) 356-5222
Fax: (912) 692-1006
E-mail: infosavannah@beardmarine.com
Web: www.beardmarine.com

South Dakota

Midwest Marine Supply

Location: St. Clair Shores, Michigan, USA
Phone: (586) 778-8950
Fax: (586) 778-6108
E-mail: sales@midwestmarinesupply.com
Web: www.midwestmarinesupply.com

Tennessee

Beard Marine Savannah - Distributor

Location: Savannah, Georgia, USA
Phone: (912) 356-5222
Fax: (912) 692-1006
E-mail: infosavannah@beardmarine.com
Web: www.beardmarine.com

Texas

AER Marine Supply

Location: Seabrook, Texas, USA
Phone: (281) 474-3276
Fax: (281) 474-2714
E-mail: richard.miller@aersupply.com
Web: www.aersupply.com

Utah

AER Marine Supply

Location: Seabrook, Texas, USA
Phone: (281) 474-3276
Fax: (281) 474-2714
E-mail: richard.miller@aersupply.com
Web: www.aersupply.com

Vermont

Ocean Options

Location: Tiverton, Rhode Island, USA
Phone: (401) 624-7334
Fax: (401) 624-8050
E-mail: Sales@oceanoptions.com
Web: www.oceanoptions.com

Virginia

Ocean Options - Mid Atlantic

Location: Annapolis, Maryland, USA
Phone: (410) 268-9365
Fax: (410) 268-8199
E-mail: Sales@oceanoptions.com
Web: www.oceanoptions.com

Washington

American Marine Contractors

Location: Seattle, Washington, USA
Phone: (206) 660-2240
Fax: (206) 548-5008
E-mail: Cliff@nwmarineair.com

West Virginia

Ocean Options - Mid Atlantic

Location: Annapolis, Maryland, USA
Phone: (410) 268-9365
Fax: (410) 268-8199
E-mail: Sales@oceanoptions.com
Web: www.oceanoptions.com

Wisconsin

Midwest Marine Supply

Location: St. Clair Shores, Michigan, USA
Phone: (586) 778-8950
Fax: (586) 778-6108
E-mail: sales@midwestmarinesupply.com
Web: www.midwestmarinesupply.com

Wyoming

American Marine Contractors

Location: Seattle, Washington, USA
Phone: (206) 660-2240
Fax: (206) 548-5008
E-mail: Cliff@nwmarineair.com

Argentina

Baron SRL

Location: San Fernando, Buenos Aires, Argentina
Phone: (54) 11-4-580-5556
Fax: (54) 11-4-746-1696
E-mail: rosito@baron.com.ar
Web: www.baron.com.ar

Australia

Seairland Systems, Inc.

Location: Brisbane, Queensland, Australia
Phone: (61) 7-3268-7511
Fax: (61) 7-3268-1445
E-mail: hadyn@seairland.com.au

Bahamas

Bradford Grand Bahama, Ltd.

Location: Freeport, Grand Bahama, Bahamas
Phone: +242-352-7711
Fax: +242-352-7695
E-mail: dan@bradford-grand-bahama.com
Web: www.bradford-grand-bahama.com

Freezing Point, Ltd.

Location: Nassau, Bahamas
Territory: Nassau
Phone: (242) 325-3589
Fax: (242) 356-5271
E-mail: rolandknowles@bahamas.net.bs

Bahrain

Mantech

Location: Dubai, United Arab Emirates
Phone: +(971) 4-3332-542
Fax: +(971) 4-3330-649
E-mail: mqe@emirates.net.ae

Brazil

Marine Express

Location: Sao Paulo, Brazil
Phone: 55-11-5182-7166
Fax: 55-11-5183-3636
E-mail: fabrizio@marinexpress.com.br
Web: www.marinexpress.com.br

British Virgin Islands

BVI Marine Management

Location: Roadtown, Tortola, British Virgin Islands
Phone: (284) 494-2938
Fax: (284) 494-5006
E-mail: rescuer1@surfbvi.com

C & G Refrigeration

Location: , Tortola, British Virgin Islands
Phone: (284) 776-0038

Parts And Power

Location: Tortola, British Virgin Islands
Phone: 284-494-2830
Fax: 284-494-1584
E-mail: info@partsandpower.com
Web: www.partsandpower.com

British West Indies

Caribbean Marine & Diesel

Location: Turks and Caicos Islands, British West Indies
Phone: 649-941-5903
Fax: 649-941-5902
E-mail: caribmarinediesel@tciway.tc

Canada

British Columbia

American Marine Contractors

Location: Seattle, Washington, USA
Phone: (206) 660-2240
Fax: (206) 548-5008
E-mail: Cliff@nwmarineair.com

Ontario

Northland Supply Company

Location: Queensville, Ontario, Canada
Territory: Queensville
Phone: (905) 478-2244
Fax: (905) 478-2295
E-mail: norsupco@aol.com
Web: www.norsupco.com

Woodard and Company - Manufacturer's Rep.

Location: Concord, Ontario, Canada
Territory: All Canadian Provinces except BC
Phone: (905)760-0245
Fax: (905)760-0250
E-mail: john.reid@woodardcompany.com

Quebec

Kimpex, Inc.

Location: Drummondville, Quebec, Canada
Territory: Drummondville, Quebec
Phone: (705) 721-0947
Fax: (705) 721-1704
E-mail: scott.pipher@kpx-kimpex.com
Web: http://www.kpx-kimpex.com

Caribbean Islands

BVI Marine Management

Location: Roadtown, Tortola, British Virgin Islands
Phone: (284) 494-2938
Fax: (284) 494-5006
E-mail: rescuer1@surfbvi.com

C & G Refrigeration

Location: , Tortola, British Virgin Islands
Phone: (284) 776-0038

Caraibe Greemant

Location: Le Marin, Martinique, French West Indies
Phone: 596 596 74 80 33
E-mail: cgmar@wanadoo.fr

Caribbean Marine & Diesel

Location: Turks and Caicos Islands, British West Indies
Phone: 649-941-5903
Fax: 649-941-5902
E-mail: caribmarinediesel@tciway.tc

Centro Cruisair de Puerto Rico

Location: Santurce, Puerto Rico
Phone: 787-727-3637
Fax: 787-727-3637
E-mail: fernan_moreno@hotmail.com

Cool-Tech Air Condition

Location: Fajardo, Puerto Rico
Phone: (787) 860-2615
Fax: (787) 801-2050
E-mail: cayala@cooltechac.com
Web: http://www.cooltechac.com/

Enertech N.V.

Location: Simpson Bay, St. Maarten/St. Martin, Netherlands Antilles
Phone: +599-551-2145
Fax: +599-544-4608
E-mail: service@enertechnv.com
Web: www.enertechnv.com

Freezing Point, Ltd.

Location: Nassau, Bahamas
Territory: Nassau
Phone: (242) 325-3589
Fax: (242) 356-5271
E-mail: rolandknowles@bahamas.net.bs

Frostline

Location: Cole Bay, St. Maarten/St. Martin, Netherlands Antilles
Phone: 599 522 9610 (Technical)
Fax: 599 544 3263
E-mail: paul@frostline.biz (technical); glyn@frostline.biz

Iceberg Refrigeration

Location: Guadeloupe, French West Indies
Phone: 590-24 35 35
Fax: 590-24 35 35

May Day Marine

Location: San Juan, Puerto Rico
Phone: 787-637-0756
Fax: 787-790-2551

Nau-T-Kol Marine Refrigeration

Location: Chaguaramas, Trinidad
Phone: 868-634-2174
Fax: 868-634-2174
E-mail: nautkol@cablenett.net
Web: www.nautkol.com

Reefco, Inc.

Location: St. Thomas, US Virgin Islands
Phone: (340) 776-0038
Fax: (340) 776-0038
E-mail: dennyedy@viaccess.net
Web: www.reefco.net

Regis Electronics (St Lucia) LTD.

Location: St. Lucia, West Indies
Phone: 758-452-0205
Fax: 758-452-0206
E-mail: stlucia@regiselectronics.com
Web: www.regiselectronics.com

Suncool Air Conditioning

Location: Carolina, Puerto Rico, Puerto Rico
Territory: Carolin
Phone: (787) 791-6971
Fax: (787) 791-3885
E-mail: suncool1@coqui.net

The Signal Locker

Location: English Harbour, Antigua, West Indies
Territory: Antigua
Phone: (268) 460-1528
Fax: (268) 460-1148
E-mail: lockers@candw.ag

China

Flash Marine Trading Pte.Ltd.

Location: Shanghai, China
Phone: (86 21) 509 04120
Fax: (86 21) 509 04789
E-mail: fmtmasb@online.sh.cn

Colombia

Todomar Marina CHL S.A.

Location: Cartagena, Colombia
Phone: +57-5-6654177
Fax: +57-5-6655118
E-mail: flondono@todomarchl.com

Costa Rica

CR Marine Supply S.A.

Location: Garrabito, Costa Rica
Territory: Costa Rica
Phone: 506-637-7419
Fax: 506-637-7180
E-mail: info@crmarinesupply.com

Croatia

Dometic Condaria 87 SRL

Location: Nova Milanese (MI), Italy
Phone: 39 0362 44182
Fax: 39 0362 452226
E-mail: condaria@tin.it

Alfateh 2000

Location: Opatia, Croatia
Phone: +385-51-272981
Fax: +385-51-718150
E-mail: alfateh-2000@ri.t-com.hr

Cyprus

Dometic Marine - United Kingdom, Sales Company

Location: Poole, Dorset, England
Phone: 44 870 3306101
Fax: 44 870 3306102
E-mail: sales@dometicmarine.com
Web: www.dometic.com

Dominican Republic

May Day Marine

Location: San Juan, Puerto Rico
Phone: 787-637-0756
Fax: 787-790-2551

Ecuador

Quasar Nautica, S.A.

Location: P.O. Box 17-01-0069, Quito, Ecuador
Phone: (593) 2-446-996/997
Fax: (593) 2-436-625

Egypt

New Air

Location: Abasia, Cairo, Egypt
Phone: +202 24829341
Fax: +202 26847700
E-mail: info@newairegypt.com
Web: wwwlhewairegypt.com

France

Dometic Marine – France, Sales Company

Location: Plailly, France
Phone: Cell: 0033 (0)680 415 543
Fax: 0033 (0)344 633 518
E-mail: marine.sales@dometic.fr
Web: www.dometic.com

PolyMarine Distribution (C/O Occas Marine)

Location: Le Cannet, Rocheville, France
Phone: 0033 493463634
Fax: 0033 493463634
E-mail: polymarine.bayle@free.fr

French West Indies

Caraibe Greemant

Location: Le Marin, Martinique, French West Indies
Phone: 596 596 74 80 33
E-mail: cgmar@wanadoo.fr

Iceberg Refrigeration

Location: Guadeloupe, French West Indies
Phone: 590-24 35 35
Fax: 590-24 35 35

Greece

Dometic Marine - United Kingdom, Sales Company

Location: Poole, Dorset, England
Phone: 44 870 3306101
Fax: 44 870 3306102
E-mail: sales@dometicmarine.com
Web: www.dometic.com

Athens

Aegean Diesel Electric Ltd.

Location: Athens, Piraeus, Greece
Territory: Athens
Phone: +30 210 42 22 484
Fax: +30 210 41 75 201
E-mail: info@ade-marine.gr

Hong Kong

Piercey Marine Limited

Location: Sai Kung, NT, Hong Kong
Phone: (852) 2791-4106
Fax: (852) 2791-4124
E-mail: pmltd@netvigator.com

Italy

Dometic Condaria 87 SRL

Location: Nova Milanese (MI), Italy
Phone: 39 0362 44182
Fax: 39 0362 452226
E-mail: condaria@tin.it

Japan

Tominaga & Company, Ltd.

Location: Osaka, Japan
Phone: 816.6365.5010
Fax: 816.6365.6294
E-mail: nishi@mail.tomco.co.jp

Kuwait

Mantech

Location: Dubai, United Arab Emirates
Phone: +(971) 4-3332-542
Fax: +(971) 4-3330-649
E-mail: mge@emirates.net.ae

Sammari Marine Trading

Location: Al-Shawikh, Kuwait
Phone: 965-5740408
Fax: 965-5715655

Malta

Dometic Marine - United Kingdom, Sales Company

Location: Poole, Dorset, England
Phone: 44 870 3306101
Fax: 44 870 3306102
E-mail: sales@dometicmarine.com
Web: www.dometic.com

Inmartech Ltd.

Location: Swieqi, STJ 04, Malta
Phone: 00356 21376476
Fax: 00356 21376476
E-mail: inmartech@waldonet.net.mt

Mexico

Southern California Marine Enterprises

Location: San Diego, California, USA
Phone: 619-224-2869
Fax: 619-226-0496
E-mail: sales@southerncalmarine.com
Web: www.southerncalmarine.com

Netherlands

Eberca

Location: , Netherlands
Phone: 31 1866 21955
Fax: 31 1866 21818
E-mail: info@eberca.nl

Heinen & Hopman Eng. Bv.

Location: Spakenburg, Netherlands
Phone: (31) (0) 33 2992500
Fax: (31) (0) 33 299 2599
E-mail: info@heinenhopman.com
Web: www.heinenhopman.com

Netherlands Antilles

Enertech N.V.

Location: Simpson Bay, St. Maarten/St. Martin, Netherlands Antilles
Phone: +599-551-2145
Fax: +599-544-4608
E-mail: service@enertechnv.com
Web: www.enertechnv.com

Frostline

Location: Cole Bay, St. Maarten/St. Martin, Netherlands Antilles
Phone: 599 522 9610 (Technical)
Fax: 599 544 3263
E-mail: paul@frostline.biz (technical); glyn@frostline.biz

New Zealand

Whiting Power Systems

Location: 192 Herne Bay, Auckland, New Zealand
Phone: 649.358.2050
Fax: 649.358.0285
E-mail: sales@whiting.co.nz
Web: www.whiting.co.nz

Oman

Mantech

Location: Dubai, United Arab Emirates
Phone: +(971) 4-3332-542
Fax: +(971) 4-3330-649
E-mail: mge@emirates.net.ae

OHI Marine LLC

Location: Muscat, Oman
Phone: 968-712240
Fax: 968-712085

Pakistan

Breeze Marketing

Location: Karachi, Pakistan
Phone: +(92-21) 5883662, 5380735 & 5883824
Fax: +(92-21) 5883813
E-mail: m-a@cyber.net.pk

Mantech

Location: Dubai, United Arab Emirates
Phone: +(971) 4-3332-542
Fax: +(971) 4-3330-649
E-mail: mge@emirates.net.ae

Panama

Evans International Services SA

Location: Panama City, Panama
Territory: Panama
Phone: 507-232-5406
Fax: 507-232-7648
E-mail: info@evansint.com
Web: www.evansint.com

Panama Yacht Sales and Service

Location: Panama City, Panama
Phone: 507-314-3345
Fax: 507-314-3346
E-mail: info@panamayachtsales.com

Productos Marine Air

Location: La Chorrea, Panama
Territory: Panama
Phone: 507-232-5406
Fax: 507-232-7648
E-mail: masters@sinfo.net

Peru

Corporación Frío Novo SAC

Location: Lima (La Molina), Peru
Phone: (511) 451-5052
E-mail: frionovo@infonegocio.net.pe

Portugal

PowerCool LDA

Location: Portimao, Portugal
Territory: Portugal
Phone: 351 91 786 63 73
Fax: 351 282 461 818
E-mail: info@powercool.org
Web: www.powercool.org

Puerto Rico

Centro Cruisair de Puerto Rico

Location: Santurce, Puerto Rico
Phone: 787-727-3637
Fax: 787-727-3637
E-mail: fernan_moreno@hotmail.com

Cool-Tech Air Condition

Location: Fajardo, Puerto Rico
Phone: (787) 860-2615
Fax: (787) 801-2050
E-mail: cayala@cooltechac.com
Web: http://www.cooltechac.com/

May Day Marine

Location: San Juan, Puerto Rico
Phone: 787-637-0756
Fax: 787-790-2551

Suncool Air Conditioning

Location: Carolina, Puerto Rico, Puerto Rico
Territory: Carolin
Phone: (787) 791-6971
Fax: (787) 791-3885
E-mail: suncool1@coqui.net

Qatar

Al-Badi Trading Co.

Location: Doha, Qatar
Phone: 974-4320715
Fax: 974-4442888
E-mail: albadi@qatar.net.qa

Mantech

Location: Dubai, United Arab Emirates
Phone: +(971) 4-3332-542
Fax: +(971) 4-3330-649
E-mail: mge@emirates.net.ae

Russia

Standarte

Location: Starbeevo, Moscow region, Russia
Phone: 7 095 575 67 23
Fax: 7 095 575 39 77
E-mail: info@standarte.ru
Web: www.standarte.ru

Saudi Arabia

Mantech

Location: Dubai, United Arab Emirates
Phone: +(971) 4-3332-542
Fax: +(971) 4-3330-649
E-mail: mge@emirates.net.ae

Samaco Marine Division

Location: Alnahdah dis Jeddah, Saudi Arabia
Territory: Saudi Arabia
Phone: (966) 2-699-2300
Fax: (966) 2-699-1024

Scandinavia

Dometic Marine – Nordic Sales, Sales Company

Location: Halmstad, Sweden
Phone: 46 35165700
Fax: 46 35165710
E-mail: marine.info@dometic.se
Web: www.dometic.com

Singapore

Tripower Corporation Pte Ltd

Location: , Singapore
Phone: (65) 6861 1188
Fax: (65) 6861 4263
E-mail: mgt@tritex.com.sg; mgt@tripower.com.sg
Web: www.tritex.com.sg

Slovenia

Dometic Condaria 87 SRL

Location: Nova Milanese (MI), Italy
Phone: 39 0362 44182
Fax: 39 0362 452226
E-mail: condaria@tin.it

South Africa

C-Dynamics cc

Location: Cape Town, South Africa
Phone: 27 21 555 3232
Fax: 27 21 555 3230
E-mail: info@c-dynamics.co.za
Web: www.c-dynamics.co.za

Spain

Acastimar

Location: Tarragona, Spain
Phone: 349-77-362118
Fax: 349-77-362687
E-mail: acastimar@acastimar.com

Dometic Marine – France, Sales Company

Location: Plailly, France
Phone: Cell: 0033 (0)680 415 543
Fax: 0033 (0)344 633 518
E-mail: marine.sales@dometic.fr
Web: www.dometic.com

Techno Electronica Naval, S.A.

Location: Barcelona, Spain
Phone: 34 (93) 664-49-70
Fax: 34 (93) 665-76-26
E-mail: ten@ten-sa.com
Web: www.ten-sa.com

Sri Lanka

G&M Enterprises

Location: Borella-Colombo 8, Sri Lanka
Phone: 94 11 2691966
Fax: 94 11 2691751
E-mail: gandM@sltnet.lk

Sweden

Dometic Marine – Nordic Sales, Sales Company

Location: Halmstad, Sweden
Phone: 46 35165700
Fax: 46 35165710
E-mail: marine.info@dometic.se
Web: www.dometic.com

Taiwan

Kaohsiung

Mercury Marine Supply Co.

Location: Kaohsiung, 812, Taiwan
Territory: Taiwan
Phone: (886) 7-8133233
Fax: (886) 7-8133236
E-mail: mms46654@ms16.hinet.net

Thailand

Thai Kolon Co. Ltd.

Location: Bangkok, Thailand
Phone: 66-2-745-6468-77 (10 lines)
Fax: 66-2-745-6152
E-mail: thaikolon@thaikolon.co.th
Web: www.thaikolon.com

Trinidad

Nau-T-Kol Marine Refrigeration

Location: Chaguaramas, Trinidad
Phone: 868-634-2174
Fax: 868-634-2174
E-mail: nautkol@cablenett.net
Web: www.nautkol.com

Turkey

Arti Marin

Location: Tuzla, Istanbul, Turkey
Phone: +90 216 395 57 00
Fax: +90 216 395 61 89
E-mail: sales@artinarin.com
Web: www.artimarin.com

Dometic Marine - United Kingdom, Sales Company

Location: Poole, Dorset, England
Phone: 44 870 3306101
Fax: 44 870 3306102
E-mail: sales@dometicmarine.com
Web: www.dometic.com

U.S. Virgin Islands

Reefco, Inc.

Location: St. Thomas, US Virgin Islands
Phone: (340) 776-0038
Fax: (340) 776-0038
E-mail: dennyedy@viaccess.net
Web: www.reefco.net

Ukraine

Standarte

Location: Starbeevo, Moscow region, Russia
Phone: 7 095 575 67 23
Fax: 7 095 575 39 77
E-mail: info@standarte.ru
Web: www.standarte.ru

United Arab Emirates

Mantech

Location: Dubai, United Arab Emirates
Phone: +(971) 4-3332-542
Fax: +(971) 4-3330-649
E-mail: mge@emirates.net.ae

United Kingdom

Dometic Marine - United Kingdom, Sales Company

Location: Poole, Dorset, England
Phone: 44 870 3306101
Fax: 44 870 3306102
E-mail: sales@dometicmarine.com
Web: www.dometic.com

Uruguay

Baron SRL

Location: San Fernando, Buenos Aires, Argentina
Phone: (54) 11-4-580-5556
Fax: (54) 11-4-746-1696
E-mail: rosito@baron.com.ar
Web: www.baron.com.ar

Venezuela

Rich Marine Center

Location: Complejo Turistico El Morro, Venezuela, South America
Phone: (58) 281 2181630
Fax: (58) 281-2811630
E-mail: richmarine@telcel.net.ve

West Indies

Antigua

The Signal Locker

Location: English Harbour, Antigua, West Indies
Territory: Antigua
Phone: (268) 460-1528
Fax: (268) 460-1148
E-mail: lockers@candw.ag

St. Lucia

Regis Electronics (St Lucia) LTD.

Location: St. Lucia, West Indies
Phone: 758-452-0205
Fax: 758-452-0206
E-mail: stlucia@regiselectronics.com
Web: www.regiselectronics.com

Yemen

Mantech

Location: Dubai, United Arab Emirates
Phone: +(971) 4-3332-542
Fax: +(971) 4-3330-649
E-mail: mge@emirates.net.ae

Dometic®

Dometic Environmental Corporation
2000 N. Andrews Ave. Ext. • Pompano Beach, FL 33069 USA
Phone: 954-973-2477 • Facsimile: 954-979-4414 • www.marineair.com • sales@marineair.com

United States & Canada Service Only:
8:00 AM to 5:00 PM Eastern Time: 954-973-2477
24/7 A/C SERVICE HOTLINE: 5:00PM to 8:00 AM: 888-440-4494

International Sales & Service:
Europe & the Middle East: Call +44(0)870-330-6101
For all other areas visit our website to find your nearest distributor.

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